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VIA FEDERAL EXPRESS

Office of the Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: In Re Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service.
MM Docket No. 87-268

Dear Sir:

Enclosed please find for filing the original and nine copies of the Comments of Zenith Electronics Corporation in response to the FCC's Notice of Proposed Rule Making, released November 8, 1991, in MM Docket No. 87-268.

Very truly yours,

Wayne C. Luplow

WCL/bjp
enclosures

December 19, 1991

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

IN THE MATTER OF ADVANCED TELEVISION SYSTEMS AND THEIR IMPACT UPON THE EXISTING TELEVISION BROADCAST SERVICE.	)	MM Docket No. 87-268

COMMENTS OF ZENITH ELECTRONICS CORPORATION

As a leading consumer electronics and cable products manufacturer and as an HDTV system proponent, Zenith Electronics Corporation has an extraordinarily strong interest in the outcome of these proceedings.

Zenith is the only major U.S.-owned manufacturer of color television and high resolution color displays and is a leading supplier of head-end and decoder equipment to cable TV operators. Zenith is an active participant in the work of the FCC's Advisory Committee on Advanced Television Services and, teamed with AT&T, is the proponent of an HDTV system candidate in these proceedings. The Zenith/AT&T Digital Spectrum Compatible high definition television (DSC-HDTV) system has been certified for testing under the procedures of the Advisory Committee. Zenith applauds the efforts of the Advisory Committee and Chairman Wiley for their excellent work in setting the stage for this Notice and the subsequent rule-making procedure.

In prior Notices of Inquiry and the subsequent First Order, the Commission has shaped a series of principles, recited in paragraph 2 of this Notice, to guide establishment of a terrestrial ATV service.

Zenith continues to support the principles listed and their conclusions that a "simulcast" HDTV service is in the public interest.

The Notice addresses two principal areas: broadcaster HDTV adoption scenarios and spectrum/marketplace issues. Zenith will comment on a few of the broadcaster issues, but will concentrate most of its comments on the factors related to the spectrum issues.

1. Near-Term Implementation Issues

The Notice, in paragraphs 5-33, addresses a series of policy and administrative issues directed primarily to broadcasters and other potential HDTV applicants. Zenith responds selectively to these proposals in the belief that some of them can materially affect the ultimate future of an HDTV service and of terrestrial broadcasting.

Zenith has long understood, and has tried to be responsive to, the Commission's responsibility for spectrum use and the importance of maximizing its utility. However, Zenith shares the views expressed by Chairman Sikes and many others that HDTV is an important and vital new technology, offering the potential for a greatly improved terrestrial service that needs to succeed in order to enable benefits to be reaped over decades by consumers, broadcasters and industry.

Some seek to depreciate the future of broadcast television, citing falling broadcaster revenues and rising penetration by cable and other media. Cable penetration numbers are not the whole story. Any pay-for-television scheme is narrowcasting: monthly subscription, premium channels, and pay-per-view are increasingly narrow forms of narrow-casting in any medium. Broadcast programming, which also is carried on cable, is the only medium that truly reaches everyone today, and terrestrial broadcasting's demise should neither be permitted nor encouraged.

Supplemental Private Negotiations

Paragraph 21 proposes to permit parties within the same market to negotiate HDTV channel exchange among themselves after they have been awarded HDTV channels, and further asks whether HDTV channel exchanges between adjacent markets should be permitted.

The original allotment of channels to a market or community, as well as the assignment of specific channels to specific applicants and sites within the market, are expected to conform to an allotment table built on specific interference and spacing criteria. These criteria define the interference-limited service area of newly assigned HDTV channels and existing NTSC channels in both the market in question and all surrounding markets. Channel assignments to be exchanged could be separated by several tens of miles within a market and upwards of 100 miles between adjacent markets, with the proposed move causing conse-

quential changes in interference to other stations in these or surrounding markets.

It seems reasonable to permit only the exchange of co-located HDTV channels within a market. For any other proposed exchanges, whether within a market or between markets, the Commission should require the applicant to show that interference and spacing criteria are maintained with respect to all NTSC and HDTV channels in the markets involved in the exchange and in all surrounding markets as well.

Spectrum Issues

Paragraph 28 postulates that it may be possible to engineer an HDTV facility, in "problematic cases," to permit an HDTV allotment while still avoiding interference.

We concur that engineering techniques at the transmitter can reduce the potential for causing interference in a specific direction (e.g., toward any interfering NTSC channel) at the expense of reduced HDTV coverage, in that direction by using a directional transmitting antenna, or omnidirectional by reduced effective height. Such techniques do not address (and in fact make worse) the potential for interference to the short-spaced HDTV station from its neighbors, by reducing signal strength of this "desired" HDTV station.

Similar techniques can be applied at the receiving site - antenna directivity, height and gain. These have the potential to regain some

service area for the "problematic" station but require initiative and perhaps an expenditure by individual viewers. For example, viewers in the few problematic cases could install a receiving antenna with better front-to-back ratio than assumed in the HDTV planning factors.

Regarding the specific example cited in the Notice (in footnote 51), Zenith believes testing of the DSC-HDTV system will show that adjacent channel spacing will not be an assignment limitation if the DSC-HDTV system is selected.

2. Conversion to ATV

The Future Role of NTSC

Zenith, which pioneered the simulcast concept and demonstrated its feasibility within the existing spectrum allocated to television, endorses the general principles outlined in paragraphs 34 and 35. Zenith agrees that HDTV service will eventually replace NTSC and that broadcasters should ultimately be required to surrender one 6 MHz channel and broadcast only in HDTV when it becomes the prevalent medium.

Zenith, however, urges the Commission to take into account the realities of the color television receiver market in establishing its transition scenarios. Specifically, while most HDTV receiver discussions focus on high-end, full-featured receivers, it must be noted that the most popular screen sizes today -- 13-, 19- and 20-inch

selling today at retail prices of $200 to $350 -- make up about 70 percent of the industry's 20 million annual unit sales volume. Because of the lower prices of these products, the average U.S. household now owns two or more color TV receivers. Fully implemented HDTV technology in these screen sizes can be expected to increase the retail prices of these receivers above levels that may be widely accepted by consumers.

To sustain a high unit-volume television receiver market, the system selected as the HDTV standard must be scalable to accommodate lower resolution applications. Zenith envisions a down-converting color TV receiver, capable of receiving an HDTV signal but displaying it at a lower resolution level consistent with the size of the display.

This type of receiver would sell for a more affordable premium over its NTSC counterpart. Zenith also can envision an affordable down-conversion adaptor box, which would permit existing NTSC receivers to stay in service during and after the transition period. Additionally, Zenith can envision cable operators down-converting HDTV signals at the head-end and delivering the down-converted signal to subscribers with NTSC receivers.

To hasten the transition to HDTV and enable an orderly phase-out of NTSC, Zenith urges the Commission to select an HDTV system which is scalable and facilitates such products.

Surrendering a Frequency

In Paragraph 38, the Commission invites comment on the receiver penetration analyses presented to date.

Zenith is continuing to contribute to the effort of the Economic Factors and Market Penetration Working Party of the Advisory Committee on Advanced Television Services (PS/WP-5) to revise its preliminary estimates of market penetration (reported in Footnote 76). The latest PS/WP-5 penetration analysis predicted growth from the 1% level, but did not address how the market would get to that level from zero. However, Zenith's industry forecast predicts significant initial HDTV product acceptance in the "giant-screen" size segments of the receiver industry, the 30- to 35-inch "direct view" CRT and larger projection TVs. Our early adoption forecast is based on the perceived value to the consumer, the price/benefit trade-off, which will be driven by the following factors:

- Performance. The resolution improvement of HDTV will be most apparent and offer the greatest benefit in these large screen sizes. Because consumers always rank "picture quality" first in their TV purchase decision, this factor will sway many shoppers.

- Price. Our preliminary estimates indicate that the higher retail prices of these HDTV receivers (which initially may be 50% to 100% above today's giant-screen NTSC receivers) would still be affordable in this high-end full-featured market.
- Immediate utility. HDTV receivers will outperform conventional sets when receiving NTSC programming. Thus they will represent higher value to the consumer even in the early stages when HDTV broadcast programming is limited.

In light of these factors, we estimate that half of the consumers already predisposed to make a major investment in a giant-screen TV, will step up to HDTV as soon as it is available. With television sales in these sizes running at about one million units annually, Zenith believes "early adoption" purchases would push household penetration of HDTV up to 1% as early as the second year after HDTV receivers are introduced.

Conversion Date

Paragraphs 39-41, seek comments on ways in which a conversion date to HDTV could be selected. Zenith recommends that the Commission establish a firm date by which the conversion to HDTV would have to be completed and NTSC terminated. This date should be nationwide, not market-by-market. This approach would not only keep administration

simple, but also assure the Commission of progress toward freeing up valuable spectrum space on a timely basis. Broadcasters and hardware manufacturers (and consumers as well) would have the benefit of a clearly-defined planning horizon.

At this time Zenith recommends the Commission make known its intention to set a firm date, but wait to set that specific date until there is some history on which to judge and revise current forecasts for station conversion, receiver penetration and the availability of down-converter adaptor boxes.

For example, the Commission could take stock five years after the Report and Order establishing the HDTV service, then propose and seek comments on a date to cease NTSC broadcasting.

Zenith recognizes that the Commission desires to press for the earliest possible recovery of the spectrum space. Receiver manufacturers will continue serving the market for NTSC receivers, a market that will remain substantial until significant HDTV broadcasting and programming is available. Consumers will expect to use their newly purchased NTSC receivers for 7-10 years, so the Commission should allow at least 7 years between setting a date and actual cessation of

Switching Frequencies and Long Term Goals for the Spectrum

Paragraph 42 raises several issues related to isolated or local interchanges of (stations in) the NTSC and HDTV allocation tables.

First, should a licensee be permitted to switch HDTV operation to its NTSC channel or vice versa? In general, HDTV stations will be accommodated in the spectrum by locating them on channels presently forbidden to NTSC operation by the various NTSC protection rules, whether at VHF or UHF. There is no basis for a general assumption that NTSC stations can suddenly be located on these forbidden channels without interference to other NTSC stations. Thus if such interchanges were to be contemplated, the first test should be to assure that the proposed NTSC channel relocation does not violate protection rules with respect to any neighboring NTSC channel.

The second question is whether, at full spectrum conversion to HDTV, a licensee should be permitted to surrender its HDTV channel and move HDTV operations to its former NTSC channel. Paragraph 43 asks a corollary question: after full conversion to HDTV, should all broadcasters be required to switch back to their former NTSC channels for HDTV operation?

For a variety of reasons, Zenith believes that HDTV operations should not be returned to the surrendered NTSC channel allocation structure. For example, after NTSC service ceases, the HDTV service can operate under a new set of rules that are no longer limited by NTSC interference protection requirements, and allow much more effi-

cient spectrum use. This is already evidenced by the allocation principles and spacings being discussed for HDTV.

When NTSC operations are no longer a constraint, HDTV system properties can be further exploited in several ways.

- HDTV service area, NTSC-interference-limited in the near-term, can be significantly increased, especially if HDTV co-channel spacing approaches 150 miles as discussed in footnote 80 of the Notice.
- Additional HDTV allocations can then be made if there is demand.
- Clear bands can be provided for other services or, as suggested in the Notice, HDTV operations can be consolidated in the spectrum.

While these advantages could be pursued starting from HDTV stations on either their original HDTV channel assignments or on their "parent" NTSC channels, Zenith sees no advantage to switching HDTV back to NTSC channels. On the contrary, such a change could only be accomplished at significant expense to broadcasters and great confusion for all, especially the consumer.

Zenith believes that the Commission should consider its future options in reaching conclusions on proposals for piece-meal switching between the NTSC and HDTV allocation structures at any time. The Commission should determine whether such switching is consistent with or an impediment to reaching long-term goals, and whether it is in

anyone's best interest to contemplate two channel moves for a group of licensees - one on the licensee's initiative and another required by the Commission to reverse the process.

Zenith also asks the Commission to compare the merits of competing HDTV system proposals from the additional perspective of spectrum opportunities after NTSC channels are surrendered.

The September 1991 submission to the Advisory Committee's SS/WP-1 for test certification shows that the Zenith/AT&T Digital Spectrum Compatible HDTV system is as robust and benign with respect to HDTV co-channel interference as it is to NTSC signals. For the example of 150 mile HDTV co-channel separation, interference performance makes the DSC-HDTV system extendible to noise-limited service significantly beyond the limit imposed by NTSC protection requirements. Zenith is confident ATTC testing will confirm that the DSC-HDTV system needs no protection from HDTV signals on adjacent or NTSC-Taboo channels and has the potential to be a good spectrum neighbor to other services.

3. Patent Licensing

The Commission, in paragraph 46, seeks comment on patent licensing issues, and in particular on the extent to which a proponent's patent licensing practices should be considered during the selection of an ATV transmission system.

If the Commisssion chooses to consider the licensing practices of system proponents during the course of the selection process, it should be done for the sole purpose of gaining familiarity with possible licensing alternatives; it should be done at arms length from the Advisory Committee so as not to the selection process in any way.

In Zenith's view, the selection process should be entirely devoted to achieving one result -- the identification and selection of the best digital HDTV transmission system for the United States. That process would be seriously compromised if thought were given to selecting something less than the best system because of licensing considerations.

Zenith also believes that it would be very difficult for most systems proponents to detail their patent licensing practices in a meaningful way at this stage in the selection process. Since significant patent applications are still pending and many others are in preparation, the ultimate scope of the patents will not be known for some time. Moreover, until a proponent's system itself is finalized, it is impossible to judge how important the patents will be to the features of the system (that is, how avoidable they might be).

Deferring patent licensing issues to a later date would not give undue advantage to the proponent of the winning system. As the Commission is aware, each proponent prior to testing must submit a written statement to the Advisory Committee in the form described in the Patent Policy of the American National Standards Institute ("ANSI"), giving assurance that licenses will be made available to applicants

under reasonable terms and conditions. Advisory Committee TV Test Procedures Test Management Plan, Section 2.1.

The reasonableness standard described in the ANSI Patent Policy is not an amorphous one, as it might first appear. It derives from long-standing American patent law which mandates that successful patent claimants in patent infringement litigation recover "in no event less than a reasonable royalty." 35 U.S.C. 284. As a result of the patent statute, there exists a substantial body of case law that identifies a comprehensive set of factors for testing the reasonableness of royalty rates. For details, see Chisum, Patents (1991) Vol. 5, 20.03 [3]. By signing the ANSI statement, each system proponent already undertakes to offer a patent license that meets this reasonableness test. The test also provides the Commission with expert guidance in evaluating any patent license a successful proponent may tender. If the tendered license fails to meet the test, the Commission surely would have the administrative authority to reject the license proposal.

Should the Commission decide to begin its examination of patent licensing issues during the selection process, we believe that high priority should be given to exploring licensing alternatives that would foster U.S. world leadership in HDTV. The Government has a unique opportunity here to help domestic industry become state-of-the-art manufacturers of high definition products and components. Our country should make, use and export the critical HDTV and components, not just import them.

To help foster U.S. production, we urge that the Commission consider whether it would approve a dual licensing structure that would offer a substantially lower royalty rate to firms that utilize HDTV components made in the United States than would be asked of firms utilizing foreign-made components.

This could be accomplished through a domestic content rule -- 50% or more -- similar to the industry content rules found in the U.S. Free Trade Agreement with Canada (and currently under negotiation with Mexico). Care would have to been taken to tighten so-called "transformation" and "roll back" formulas for determining domestic content so that content requirements could not be evaded. But if this were done, a dual-royalty-rate program would go a long way to helping domestic industry attract the capital investment needed to make HDTV a U.S. success story, rather than just another incremental volume opportunity for Far East producers sustained by controlled home markets or for state-subsidized European producers.

4. Compatibility with Other Media

Compatibility with other media should be an important consideration in the HDTV standard selection process. Since the inception of its HDTV development, Zenith has held that, while the primary efforts should focus on terrestrial broadcasting and assuring a smooth transition from NTSC to HDTV, friendliness to compatibility with other media is a critical consideration.

Zenith believes that only with broad complementary applications -- particularly cable TV, DBS, and low-cost VCRs -- will HDTV become a truly successful consumer service. In addition, satellite distribution of programming to broadcasters and cable head-ends (and for some auxiliary services) must be supported. To that end, Scientific-Atlanta recently joined Zenith and AT&T to pursue satellite applications of the DSC-HDTV system.

Paragraph 47 seeks comments on the desirability of addressing the various issues of interoperability, extensibility, scalability, etc., in HDTV systems and the overall importance of these factors. Zenith and AT&T have been working diligently on these issues and generally share the concerns of the computer industry.

Digital technology has broadened the horizon for HDTV. Digital television, by its very nature, is more interoperable with computer technologies than its analog counterpart. Some proposed HDTV systems, such as the Zenith/AT&T system, have incorporated significant computer-compatibility attributes such as progressive scanning and square pixels, into their designs from the outset. Accordingly, Zenith believes that compatibility with other digital communications media is important to full development and acceptance of HDTV.

We urge the Commission to examine these issues carefully and take them into account when selecting the HDTV broadcast standard. However, as important as computer compatibility issues are, they should not delay the process of initiating HDTV television service.

Respectfully submitted,

ZENITH ELECTRONICS CORPORATION

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